Global No.1 Testing Laboratory Universal Certification Solution

FCC TEST REPORT

Product name:	**Fingerprint Recognition Proximity Reader**
FCC ID:	**OYULX006**
Model:	**LX006**
Standards:	**FCC CFR 47 PART 15 SUBPART C, Section 15.209**
Applicant:	**ID-Teck Co Ltd**
Test Report No.:	**UCSFR-1603-001**

UCS Co., Ltd.

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FCC TEST REPORT

Report Number		UCSFR-1603-001		
Applicant	Company Name	IDTeck Co Ltd		
	Address	684-1, Deaungchon-Dong, Gangsuh-Gu, Seoul, South Korea		
Product	Product Name	Fingerprint Recognition Proximity Reader		
	FCC ID	OYULX006		
	Model No.	LX006		
	Manufacturer	ID-Teck Co Ltd		
	Serial No.	-		
Other	Receipt Date	2016.02.15	Receipt Number	UCS-R-2016-0108
	Issued Date	2016.03.30	Tested Date	2016.03.28 ~ 2016.03.29
Standards		FCC CFR 47 PART 15 SUBPART C, Section 15.209		
Tested by		Y. Choi (Sign)		
Approved by		Y. M. Choi (Sign)		

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Contents

Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
UCSFR-1603-001	30-Mar-16	Initial Issue	All

1. Applicant Information

Applicant Name : ID-Teck Co Ltd
Address : 684-1, Deaungchon-Dong, Gangsuh-Gu, Seoul, South Korea

Manufacturer : ID-Teck Co Ltd
Address : 684-1, Deaungchon-Dong, Gangsuh-Gu, Seoul, South Korea

2. EUT (Equipment under test) Information

Equipment Class	DCD – Low Power Transmitter below 1 705 kHz
Product name	Fingerprint Recognition Proximity Reader
Model name	LX006
Power source	DC 12 V (Used AC/DC Adaptor)
Frequency range	0.125 MHz
Modulation Technique	FSK
Antenna Type	Integral loop coil antenna

3. Laboratory Information

UCS Co., Ltd.
- #702, AnyangMegavally, 268 Hagui-ro, Dongan-gu, Anyang-si, Gyeonggi-do, 14056 Korea.

ER Center
- #35-13 Hwalcho-gil, 109beon-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, 18278 Korea

Test site
- FCC Registration Number: 803225
- This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

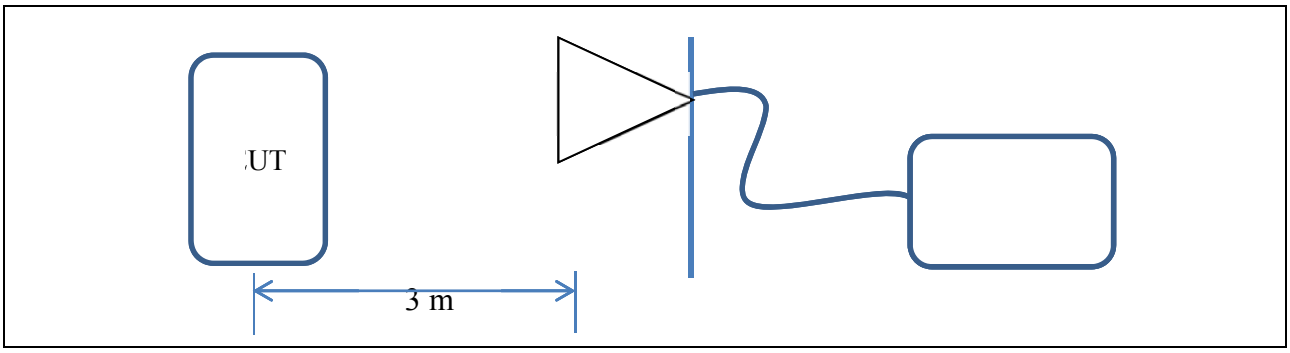
4. Test Configuration and Condition

4.1 EUT operating condition

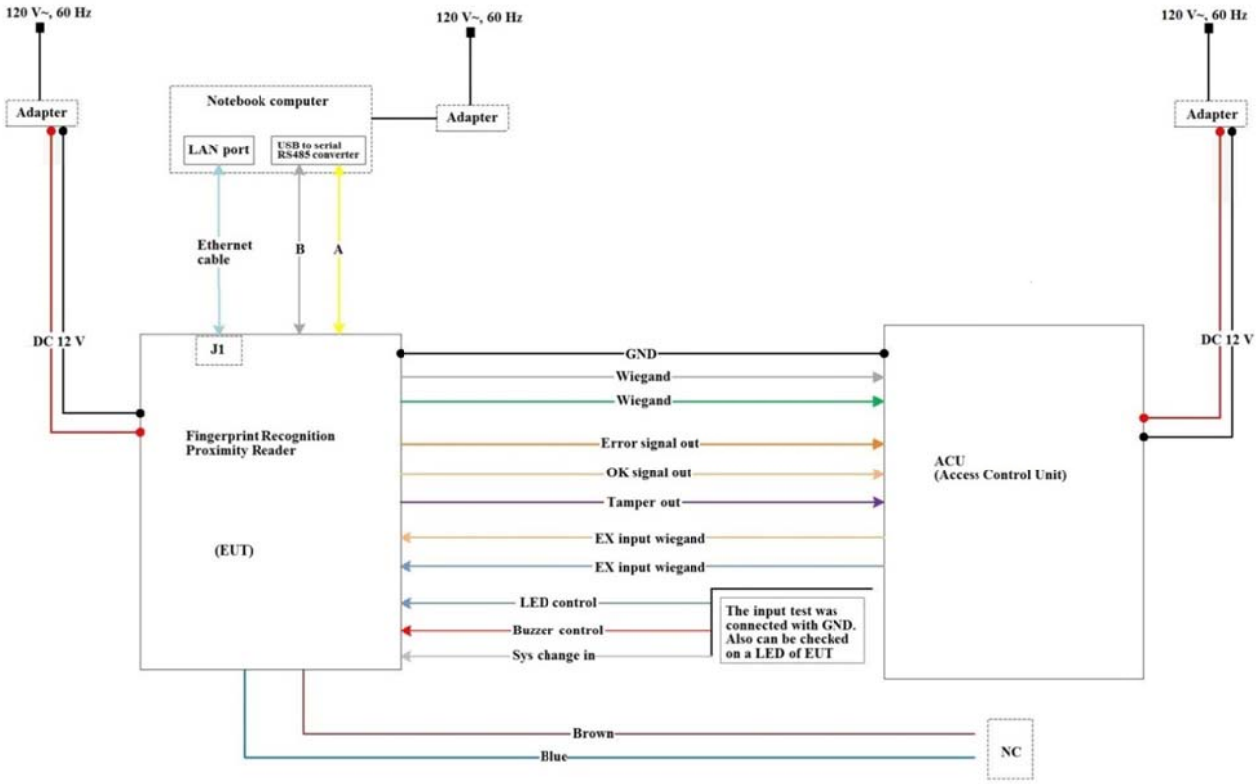
- The EUT had been tested under the operating condition.
- There are one channels have been tested as following:

Channel	Frequency [MHz]
Fundamental	0.125

4.2 EUT test configuration diagram



[System Block Diagram of Test Configuration]



4.3 Peripheral equipments list for test

Equipment Name	Model	Serial Number	Manufacturer
Fingerprint Recognition Proximity Reader (EUT)	LX006	-	ID-Teck Co Ltd
ACU (Access Control Unit)	iCON100	-	ID-Teck Co Ltd
Adapter 1	DSA-60W-12	-	Dee Van Electronics (Shenzhen)Co ., Ltd.
Adapter 2	ADP-5412VE	-	Dong Yang E&P
Adapter 3	API3AD05	-	Acble Electronic(Dong Guan)Co ., Ltd.
Notebook computer	NT-R55	056K93CLA00606P	SAMSUNG

4.4 Cable connections

Start		End		Cable	
Name	I/O Port	Name	I/O Port	Length	Spec.
Fingerprint Recognition Proximity Reader EUT)	DC in	Adapter 1	DC out	2.5	Unshielded
	GND	ACU (Access Control Unit)	GND	10	Unshielded
	Wiegand (D0)		Wiegand (D0)	10	Unshielded
	Wiegand (D1)		Wiegand (D1)	10	Unshielded
	Error signal output		Error signal input	10	Unshielded
	OK signal output		OK signal input	10	Unshielded
	Tamper input		Tamper output	10	Unshielded
	Ex input Wiegand		Ex output Wiegand	10	Unshielded
	Ex input Wiegand		Ex output Wiegand	10	Unshielded
	LED control		LED control	10	Unshielded
	Buzzer control		Buzzer control	10	Unshielded
	Sys change in		Sys change out	10	Unshielded
	LAN	Notebook computer	LAN	10	Unshielded
	RS485		USB	10	Unshielded
ACU (Access Control Unit)	DC in	Adapter 2	DC out	1.0	Unshielded
Notebook computer	DC in	Adapter 3	DC out	2.0	Unshielded

4.5 EUT modifications

- None

5. Summary of Test Results and Measurement Procedures

5.1 Summary of test results

Standard	Test Item	CFR 47 Section	Result
FCC CFR 47 Subpart C Part 15.209	Antenna Requirement	15.203	PASS
	Conducted Emissions	15.207	PASS
	Field Strength of Radiated Emissions	15.209	PASS
	20 dB bandwidth	N/A	PASS

5.2 AC powerline conducted emission test

The EUT was connected to adaptor and the power of adaptor was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

5.3 Radiated emission test

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10:2013 to determine the worse operating conditions. The radiated emissions measurements were performed on the 3 m open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

6. Test Results

6.1 Antenna requirement

6.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.1.2 Results: PASS

The transmitter has an intergral Loop coil antenna.

6.2 AC power line conducted emissions

6.2.1 Regulation

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission [MHz]	Conducted limit [dBμV]	
	Qausi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

6.2.2 Test procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50 Ω / 50 μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

6.2.3 Results: Pass

Table 1: Measured values of the AC Power Line Conducted Emissions

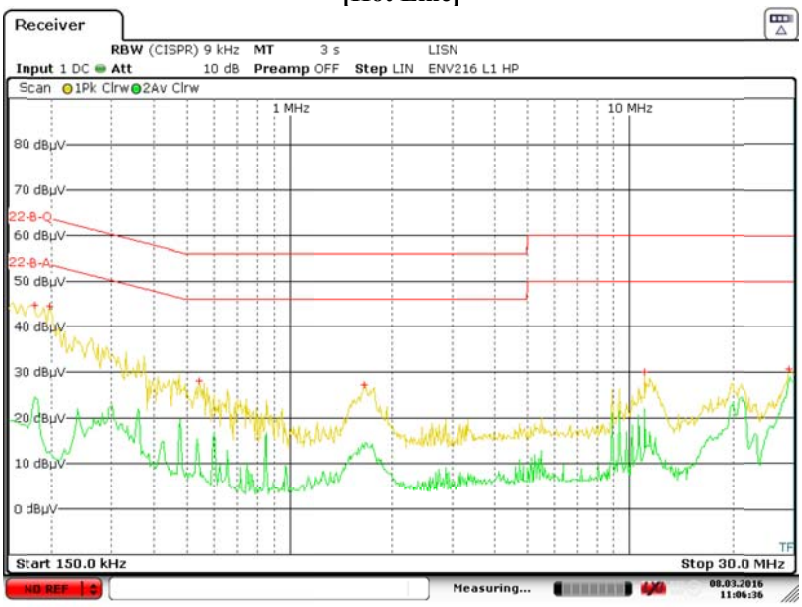
Frequency [MHz]	Factor		Line	Quasi-Peak			Average		
	LISN [dB]	Cable [dB]		Limit [dBµV]	Reading [dBµV]	Results [dBµV]	Limit [dBµV]	Reading [dBµV]	Results [dBµV]
0.16	9.86	0.04	N	65.46	37.73	47.63	55.46	-	-
0.20	9.85	0.04	H	63.61	34.89	44.78	53.61	-	-
0.54	9.89	0.08	N	56.00	18.75	28.72	46.00	-	-
1.65	9.68	0.14	H	56.00	17.34	27.16	46.00	-	-
11.03	9.72	0.45	H	60.00	20.34	30.51	50.00	-	-
29.25	9.77	0.68	N	60.00	21.08	31.53	50.00	-	-

* Remark: “H”: Hot Line, “N”: Neutral Line
* Average mode was not recorded, because Quasi-Peak values were under the Average limit.

* **Results [dBµV]** = Reading [dBµV] + LISN [dB] + Cable [dB]

6.2.4 Graph of the AC power line conducted emissions

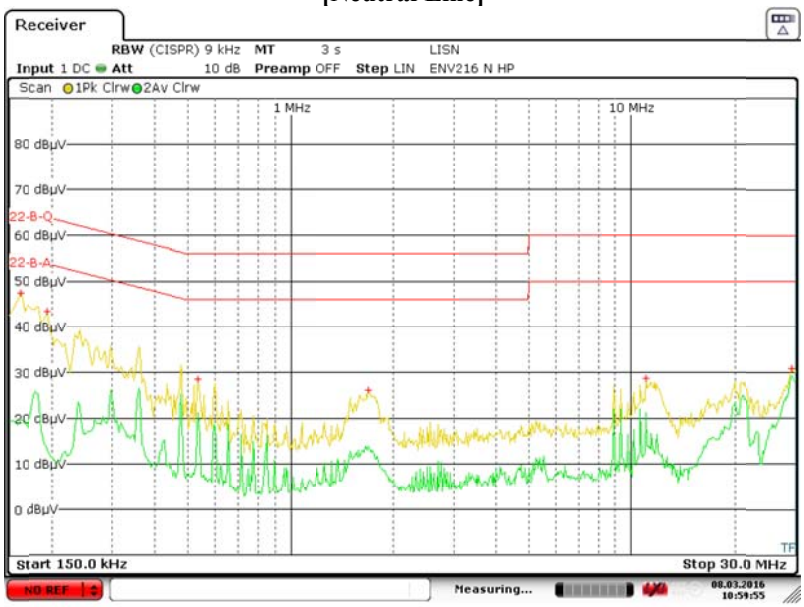
[Hot Line]



Date: 8.MAR.2016 11:06:36

*——— : Quasi-Peak, ——— : Averrage

[Neutral Line]



Date: 8.MAR.2016 10:59:56

*——— : Quasi-Peak, ——— : Averrage

6.3 Field strength of radiated emissions

6.3.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

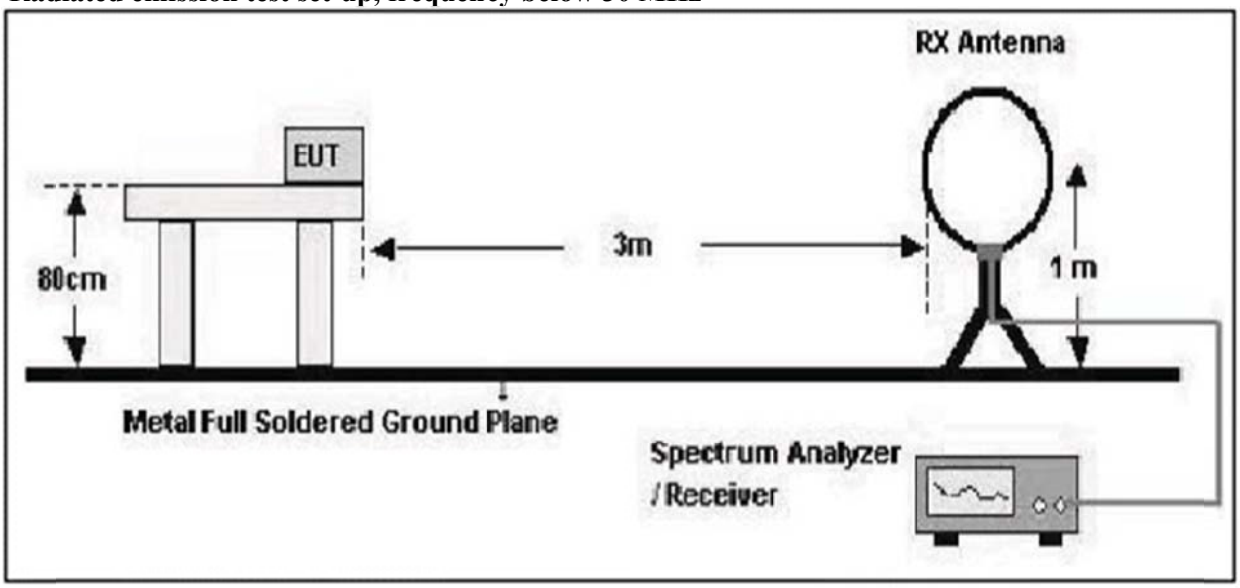
Frequency [MHz]	Field strength [μV/m]	Field strength [dBμV/m]	Measurement distance [m]
0.009 ~ 0.490	2 400 / F (kHz)	-	300
0.490 ~ 1.705	24 000 / F (kHz)	-	30
1.705 ~ 30	30	29.54	30
30 ~ 88	100	40.00	3
88 ~ 216	150	43.52	3
216 ~ 960	200	46.02	3
Above 960	500	53.98	3

According to §15.109(a), for an unintentional device, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the above table.

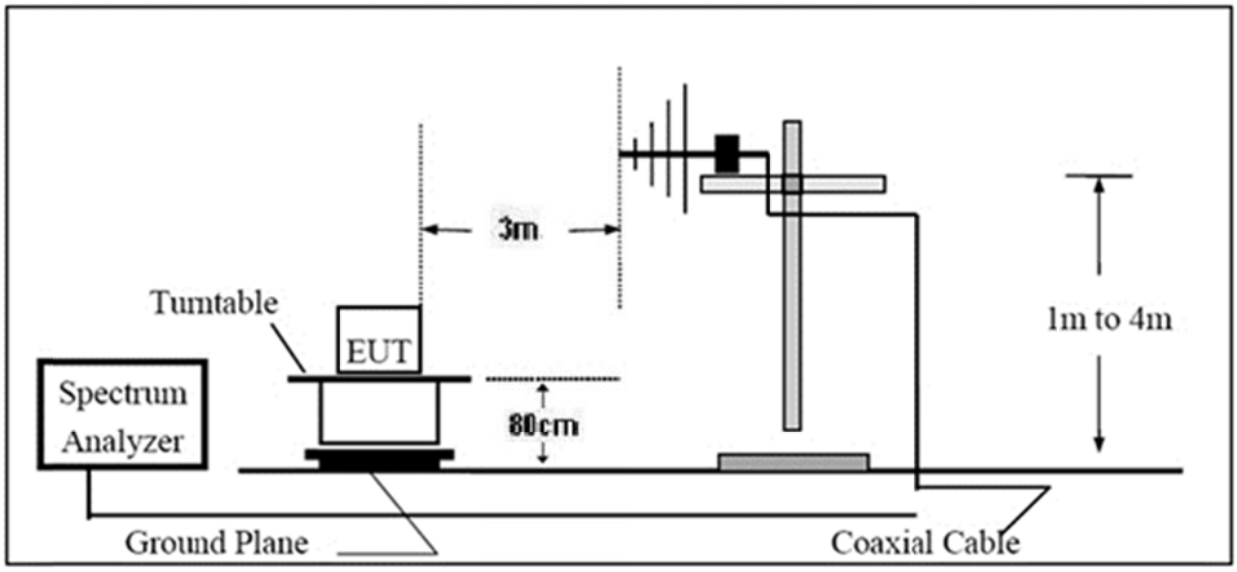
** The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector and above 1000 MHz are based on the average value of measured emissions.

6.3.2 Test setup layout

6.3.2.1 Radiated emission test set-up, frequency below 30 MHz



6.3.2.2 Radiated emission test set-up, frequency above 30 MHz



6.3.3 Test procedure

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters for above 30 MHz, and at 1 meter distance for below 30 MHz.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, from 30 to 1 000 MHz using the Trilog broadband antenna, and from 1 GHz to tenth harmonic of the highest fundamental frequency using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.
5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The EUT is situated in three orthogonal planes (if appropriate)
7. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT.
8. If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

6.3.4 Results: Pass

6.3.4.1 Test data for below 30 MHz

Table 2 : Measured values of the field strength of emissions

Frequency [MHz]	Reading [dBμV]	Ant. Pol. [V/H]	Ant. Factor [dB/m]	Cable Loss [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]
Quasi-peak data, emissions below 30 MHz							
0.022	61.67	V	14.03	0.02	75.72	120.76	-45.04
0.125	84.12	H	12.16	0.03	96.31	105.67	-9.36
5.640	45.33	V	9.44	0.60	55.37	69.54	-14.17

* Remark: “H” Horizontal, “V” Vertical

* **Emission Level [dBμV/m]** = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]
* **Margin [dB]** = Emission Level [dBμV/m] – Limit [dBμV/m]

* Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

6.3.4.2 Test data for above 30 MHz

Table 3 : Measured values of the field strength of emissions

Frequency [MHz]	Reading [dBμV]	Ant. Pol. [V/H]	Ant. Factor [dB/m]	Cable Loss [dB]	Amp Gain [dB]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]
47.28	49.49	V	13.36	1.75	31.66	32.94	40.00	-7.06
192.02	50.21	H	10.34	4.67	31.60	33.62	43.52	-9.90
269.99	53.30	V	12.82	5.91	31.59	40.44	46.02	-5.58
271.32	47.82	V	12.86	5.95	31.60	35.03	46.02	-10.99
288.06	50.69	H	13.27	6.25	31.60	38.61	46.02	-7.41
431.98	51.14	V	16.25	8.08	31.69	43.78	46.02	-2.24
Other frequencies up to 1 GHz were not observed during the test.								

* Remark: “H” Horizontal, “V” Vertical
* At the request of the applicant, after connecting the EUT and peripheral equipment, were tested move the peripheral device to an external.
* The highest frequency of the internal sources of the EUT is less than 108 MHz.

* **Emission Level [dBμV/m]** = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB] – Amp Gain [dB]
* **Margin [dB]** = Emission Level [dBμV/m] – Limit [dBμV/m]

6.4 20 dB bandwidth

6.4.1 Test condition

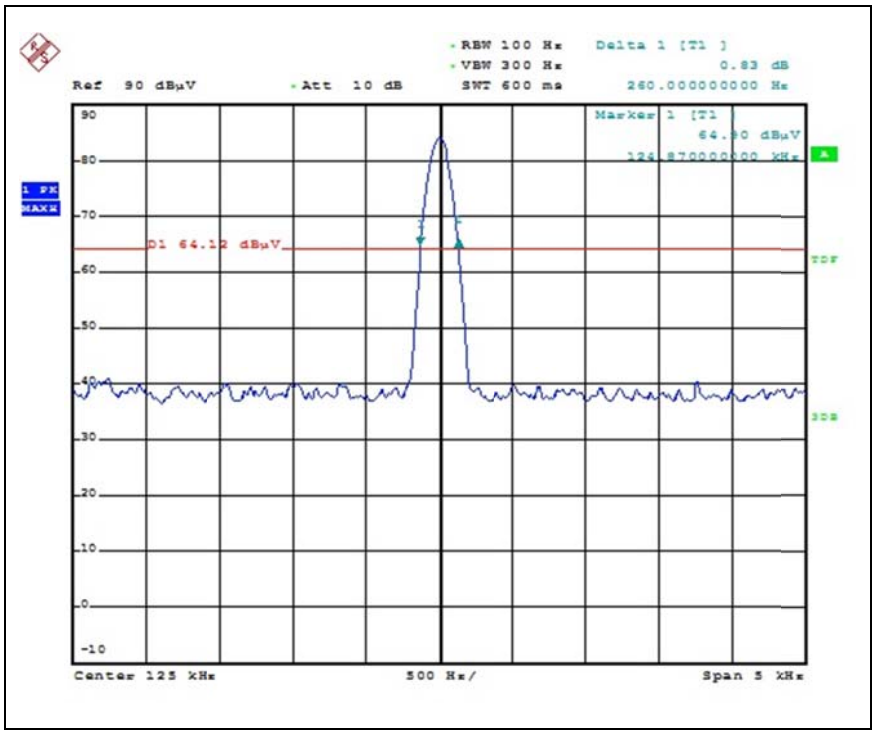
- Set RBW of Spectrum analyzer to 100 Hz, Span = 5 kHz, Sweep = auto
- The 20 dB bandwidth is defined as the frequency range where the power is higher than the peak power minus 20 dB

6.4.2 Test data

Table 4 : Measured values of the 20 dB Bandwidth			
Frequency [MHz]	**Result [Hz]**	**Limit [Hz]**	**Remark**
0.125	260	None	The point 20 dB down from the modulated carrier

* Remark: Please refer to Graph Data for bandwidth for test data.

6.4.3 Graph of the 20 dB bandwidth



7. Test Equipment Used For Test

Use	Description	Manufacturer	Model Name	Serial Number	Specifications	Next Cal. Data	Due Cal
☐	Spectrum Analyzer	H.P	E4407B	US39010225	9 kHz ~ 26.5 GHz	2017-02-05	1 Year
☐	EPM-P SERIES POWER METER	Agilent	E4416A	GB38272722	1 CH 100-240 VAC	2016-08-04	1 Year
☐	Power Sensor	Agilent	8481A	US41030240	MAX.23 dBm AVG, 18 GHz	2016-08-04	1 Year
■	Test receiver	ROHDE & SCHWARZ	ESPI3	101171	9 kHz ~ 3 GHz	2016-08-04	1 Year
■	BI-LOG ANT	SCHWARZBECK	VULB 9163	700	30 MHz ~ 1 GHz	2016-08-28	2 Years
■	Loop Antenna	EMCO	6502	9801-3191	9 kHz ~ 30 MHz	2018-02-04	2 Years
☐	Horn antenna	Schwarzbeck	BBHA 9120D	769	1 GHz ~ 18 GHz	2017-10-29	2 Years
☐	Horn antenna	Schwarzbeck	BBHA9170	BBHA9170178	18 GHz ~ 40 GHz	2018-02-26	2 Years
■	Amplifier	310N	291723	SONOMA	9 kHz ~ 1 GHz	2016-08-04	1 Year
☐	Amplifier	Agilent	8449B	120005	1 GHz ~ 26.5 GHz	2017-02-05	1 Year
☐	DC Power Supply	Maynuo	M8811	080010960011103046	30 V 5 A	2016-08-04	1 Year
■	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESR7	101120	10 Hz ~ 7 GHz	2016-08-04	1 Year
■	Two-Line V-Network	ROHDE & SCHWARZ	ENV216	3560.6550.12-101874-Rq	9 kHz ~ 30 MHz	2016-08-04	1 Year
■	Antenna Master	Audix Corporation	act-a400	20090812002	-	-	-
■	Turntable	Audix Corporation	act-t450	2009814072	-	-	-
■	Controller	Audix Corporation	act	CT-0131	-	-	-