FCC EMI TEST REPORT

FCC ID	:	**LHJ-BL28NARD2**
Equipment	:	**BL28NA-RD2**
Brand Name	:	**Continental**
Model Name	:	**BL28NA-RD2**
Applicant	:	**Continental Automotive Systems, Inc. 21440 W Lake Cook Rd., Deer Park, IL 60010, USA**
Manufacturer	:	**Continental Automotive Systems, Inc. 21440 W Lake Cook Rd., Deer Park, IL 60010, USA**
Standard	:	**FCC 47 CFR FCC Part 15 Subpart B Class B**

The product was received on Jan. 31, 2023 and testing was performed from Feb. 16, 2023 to Feb. 16, 2023. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FC313125	01	Initial issue of report	Mar. 09, 2023
FC313125	02	Revise FCC ID in Section 1.1	Mar. 16, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.107	AC Conducted Emission	Not Required	-
3.1	15.109	Radiated Emission	Pass	6.70 dB under the limit at 37.830 MHz

Note: Not required means after assessing, test items are not necessary to carry out.

Declaration of Conformity:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results. 2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".
Comments and Explanations:
The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Yun Huang

Report Producer: Doris Chen

1. General Description

1.1. Product Feature of Equipment Under Test

Product Feature	
Equipment	BL28NA-RD2
Brand Name	Continental
Model Name	BL28NA-RD2
FCC ID	LHJ-BL28NARD2
Installed into the Host	Equipment name: StrLnk2P Brand name: Continental Model name: StrLnk2P
EUT supports Radios application	GSM/WCDMA/HSPA/LTE/GNSS
HW Version	P4.0
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer.

1.2. Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz WCDMA Band IV: 2112.4 MHz ~ 2152.6 MHz LTE Band 2: 1930.7 MHz ~ 1989.3 MHz LTE Band 4: 2110.7 MHz ~ 2154.3 MHz LTE Band 5: 869.7 MHz ~ 893.3 MHz LTE Band 7: 2622.5 MHz ~ 2687.5 MHz LTE Band 12: 729.7 MHz ~ 745.3 MHz GNSS: 1559 MHz ~ 1610 MHz (GPS / Glonass / BDS / Galileo / SBAS)
Antenna Type	WWAN: Fixed Internal Antenna GNSS: Fixed external Antenna
Type of Modulation	GSM / GPRS: GMSK EGPRS: GMSK for MCS 0 ~ 4 & 8PSK for MCS5 ~9 WCDMA: QPSK (Uplink) HSDPA: 64QAM (Downlink) HSUPA: QPSK (Uplink) LTE: QPSK / 16QAM GNSS: BPSK

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.3. Modification of EUT

No modifications made to the EUT during the testing.

1.4. Test Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH10-HY

FCC designation No.: TW1132

1.5. Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR FCC Part 15 Subpart B Class B
- ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

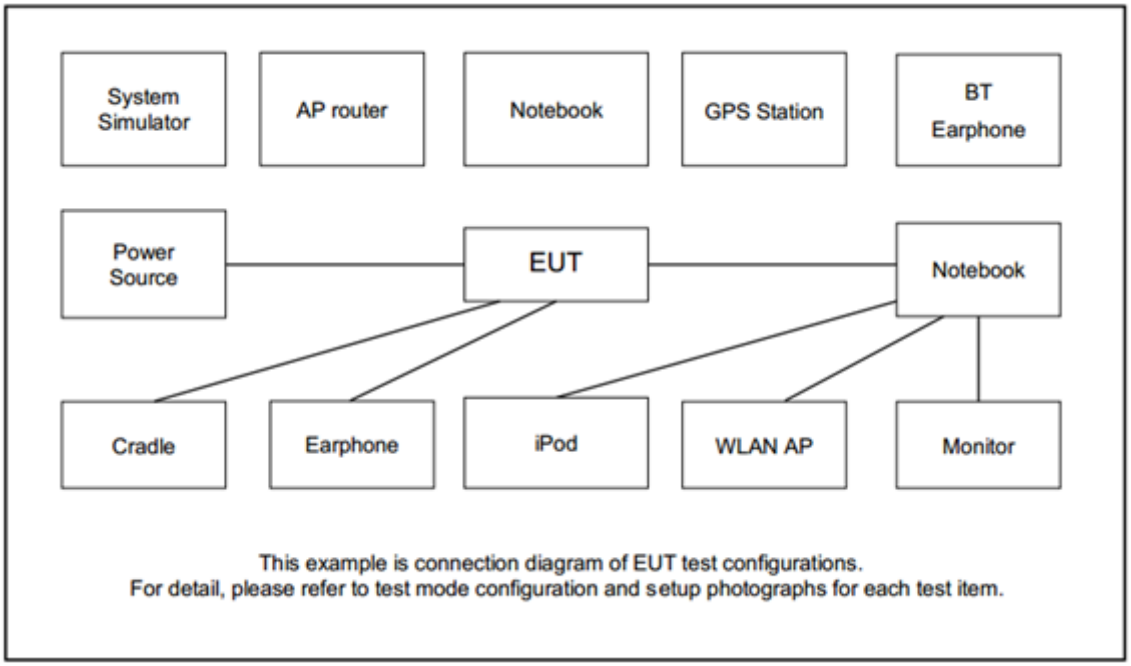
2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Radiation Emission (30 MHz to the 5th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Functions Enabled
Radiated Emissions	Mode 1: GSM 850 (GPRS Class 8) Idle + WWAN Antenna + GPS Antenna + Battery + DC12V Mode 2: WCDMA Band V Idle + WWAN Antenna + GPS Antenna + Battery + DC12V
Remark: **1.** The worst case of RE is mode 1; only the test data of this mode was reported. **2.** For Radiation Emission after pre-scanned the cellular band between 30MHz ~ 960MHz (GSM850/WCDMA Band V); only the worst case for cellular band test data of this mode was reported.	

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded,1.8m
3.	WWAN Antenna	Larsen	SPDA24700/2700	N/A	N/A	N/A
4.	GPS Antenna	Taoglas	Magma AA.170	N/A	N/A	N/A
5.	TP Load Box	Continental	N/A	N/A	N/A	N/A
6.	Power Supply	GWINSTEK	GPE-2323	N/A	N/A	Unshielded, 1.8 m

2.4. EUT Operation Test Setup

The EUT is in GSM or WCDMA idle mode during the test. The EUT is synchronized with the BCCH, and has been continuous receiving mode by setting paging reorganization of the system simulator.

At the same time, the following programs installed in the EUT are programmed during the test:

1. Execute “subaru_gen3_hwtool_0.1.16” to make the EUT receive continuous signals from GPS station.

3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.1.2. Measuring Instruments

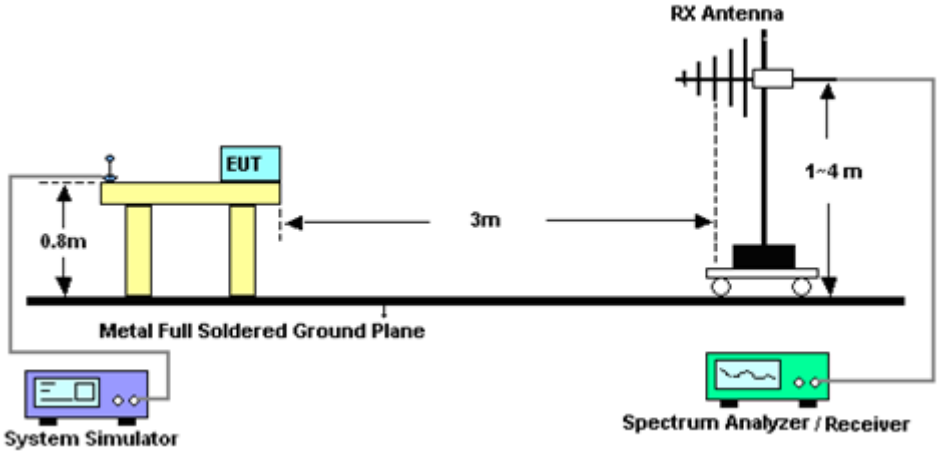
Please refer to the measuring equipment list in this test report.

3.1.3. Test Procedures

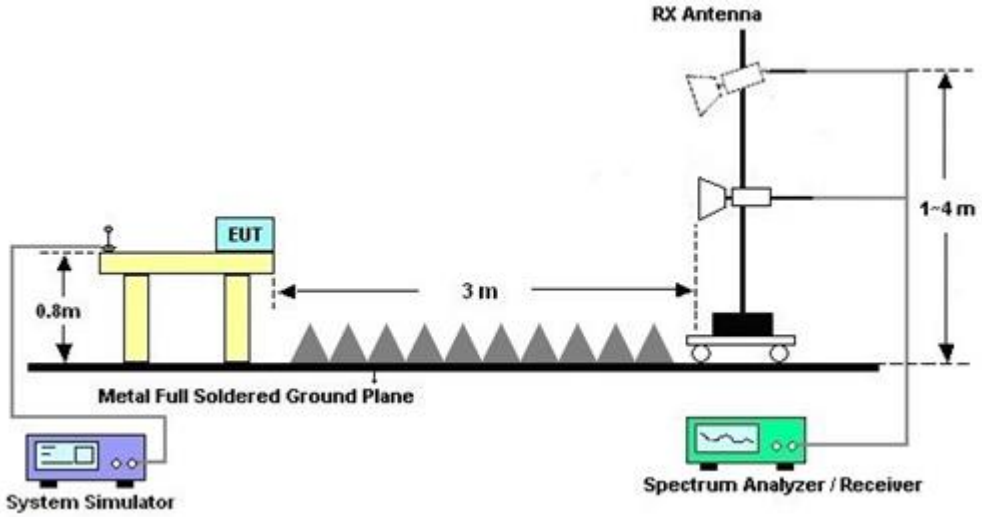
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

3.1.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions above 1GHz



3.1.5. Test Result of Radiated Emission

Please refer to Appendix A.

4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 19, 2022	Feb. 16, 2023	Oct. 18, 2023	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	35413 & 02	30MHz~1GHz	Nov. 06, 2022	Feb. 16, 2023	Nov. 05, 2023	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz~18GHz	Oct. 27, 2022	Feb. 16, 2023	Oct. 26, 2023	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800-30-10P	160118550004	1GHz~18GHz	Feb. 27, 2022	Feb. 16, 2023	Feb. 26, 2023	Radiation (03CH10-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 16, 2023	N/A	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Feb. 16, 2023	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Feb. 16, 2023	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Feb. 16, 2023	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Keysight	N9038A	MY59053012	3Hz~26.5GHz	Nov. 18, 2022	Feb. 16, 2023	Nov. 17, 2023	Radiation (03CH10-HY)
Signal Analyzer	Keysight	N9010B	MY60241055	10Hz~44GHz	Jul. 22, 2022	Feb. 16, 2023	Jul. 21, 2023	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519226/2, 804014/2, 804026/2	30MHz~40GHz	Nov. 02, 2022	Feb. 16, 2023	Nov. 01, 2023	Radiation (03CH10-HY)

5. Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.2 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.6 dB**

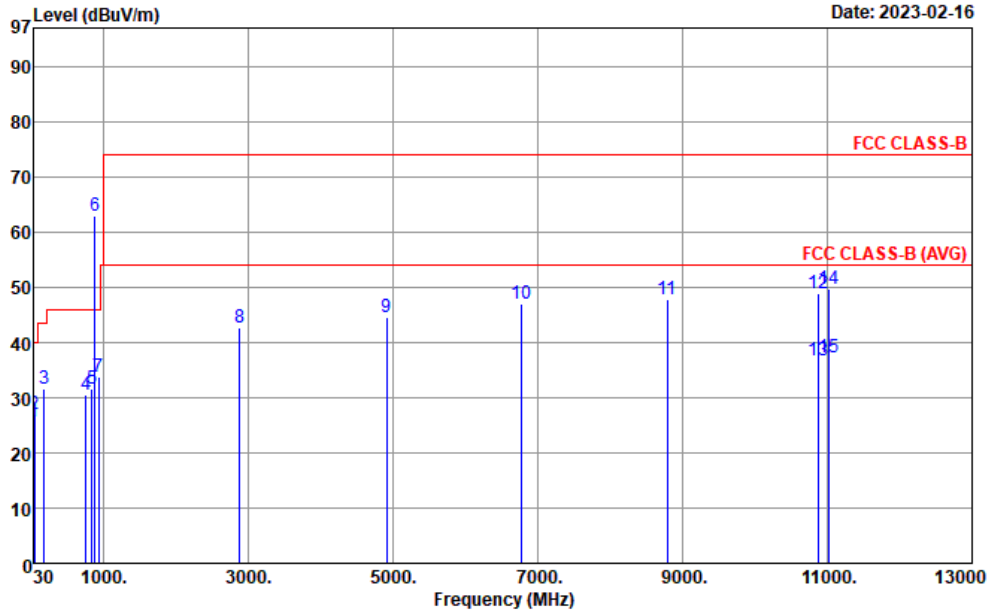
Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.3 dB**

Appendix A. Radiated Emission Test Result

Test Engineer :	Donny Tang	**Temperature :**	22.7~23.5°C
		Relative Humidity :	58.2~59.9%
Test Distance :	3m	**Polarization :**	Horizontal
Remark :	#6 is system simulator signal which can be ignored.		

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)
■ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

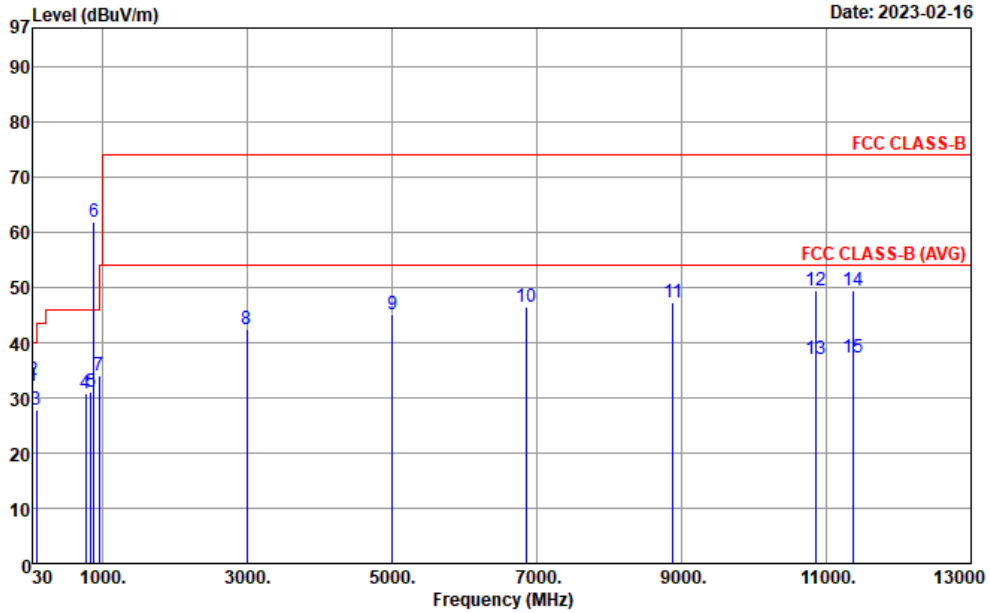


Site : 03CH10-HY
Condition : FCC CLASS-B 3m 9120D-1325_221210 HORIZONTAL
Project : 313125
Power : DC 12V
Mode : 1

		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1		38.37	25.62	-14.38	40.00	36.74	20.41	1.09	32.62	---	---	Peak
2		48.36	26.95	-13.05	40.00	43.27	15.12	1.22	32.66	---	---	Peak
3		179.85	31.74	-11.76	43.50	46.84	15.07	2.35	32.52	---	---	Peak
4		757.80	30.48	-15.52	46.00	30.06	28.05	4.81	32.44	---	---	Peak
5		843.20	31.70	-14.30	46.00	29.48	29.05	5.08	31.91	---	---	Peak
6	*	881.40	62.95			60.42	29.05	5.20	31.72	---	---	Peak
7		932.10	33.81	-12.19	46.00	29.83	30.01	5.32	31.35	---	---	Peak
8		2882.00	42.61	-31.39	74.00	63.66	28.60	9.38	59.03	---	---	Peak
9		4914.00	44.53	-29.47	74.00	59.09	32.66	12.37	59.59	---	---	Peak
10		6778.00	46.97	-27.03	74.00	56.76	36.00	14.56	60.35	---	---	Peak
11		8784.00	47.85	-26.15	74.00	53.94	37.90	16.69	60.68	---	---	Peak
12		10880.00	49.02	-24.98	74.00	51.13	38.96	18.70	59.77	---	---	Peak
13		10880.00	36.79	-17.21	54.00	38.90	38.96	18.70	59.77	---	---	Average
14		11028.00	49.64	-24.36	74.00	51.73	38.70	18.83	59.62	---	---	Peak
15		11028.00	37.41	-16.59	54.00	39.50	38.70	18.83	59.62	---	---	Average

Test Engineer :	Donny Tang	**Temperature :**	22.7~23.5°C
		Relative Humidity :	58.2~59.9%
Test Distance :	3m	**Polarization :**	Vertical
Remark :	#6 is system simulator signal which can be ignored.		

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)
■ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level



Site : 03CH10-HY
Condition : FCC CLASS-B 3m 9120D-1325_221210 VERTICAL
Project : 313125
Power : DC 12V
Mode : 1

		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1		33.24	32.18	-7.82	40.00	40.95	22.82	1.02	32.61	---	---	Peak
2		37.83	33.30	-6.70	40.00	44.17	20.67	1.08	32.62	---	---	Peak
3		84.00	27.94	-12.06	40.00	44.93	14.00	1.61	32.60	---	---	Peak
4		768.30	30.83	-15.17	46.00	30.30	28.07	4.84	32.38	---	---	Peak
5		840.40	31.14	-14.86	46.00	28.99	29.01	5.07	31.93	---	---	Peak
6	*	881.40	61.90			59.37	29.05	5.20	31.72	---	---	Peak
7		956.60	34.12	-11.88	46.00	28.71	31.15	5.38	31.12	---	---	Peak
8		2990.00	42.53	-31.47	74.00	62.76	29.30	9.55	59.08	---	---	Peak
9		5000.00	44.99	-29.01	74.00	58.99	33.10	12.47	59.57	---	---	Peak
10		6846.00	46.46	-27.54	74.00	56.35	35.82	14.65	60.36	---	---	Peak
11		8882.00	47.37	-26.63	74.00	53.41	37.94	16.78	60.76	---	---	Peak
12		10858.00	49.37	-24.63	74.00	51.47	39.03	18.68	59.81	---	---	Peak
13		10858.00	37.14	-16.86	54.00	39.24	39.03	18.68	59.81	---	---	Average
14		11364.00	49.40	-24.60	74.00	51.58	38.86	19.12	60.16	---	---	Peak
15		11364.00	37.18	-16.82	54.00	39.36	38.86	19.12	60.16	---	---	Average