

Appendix B

RF Test Data for BT V4.2(LE) (Conducted Measurement)

Product Name: I1012

Trade Mark: Hyundai

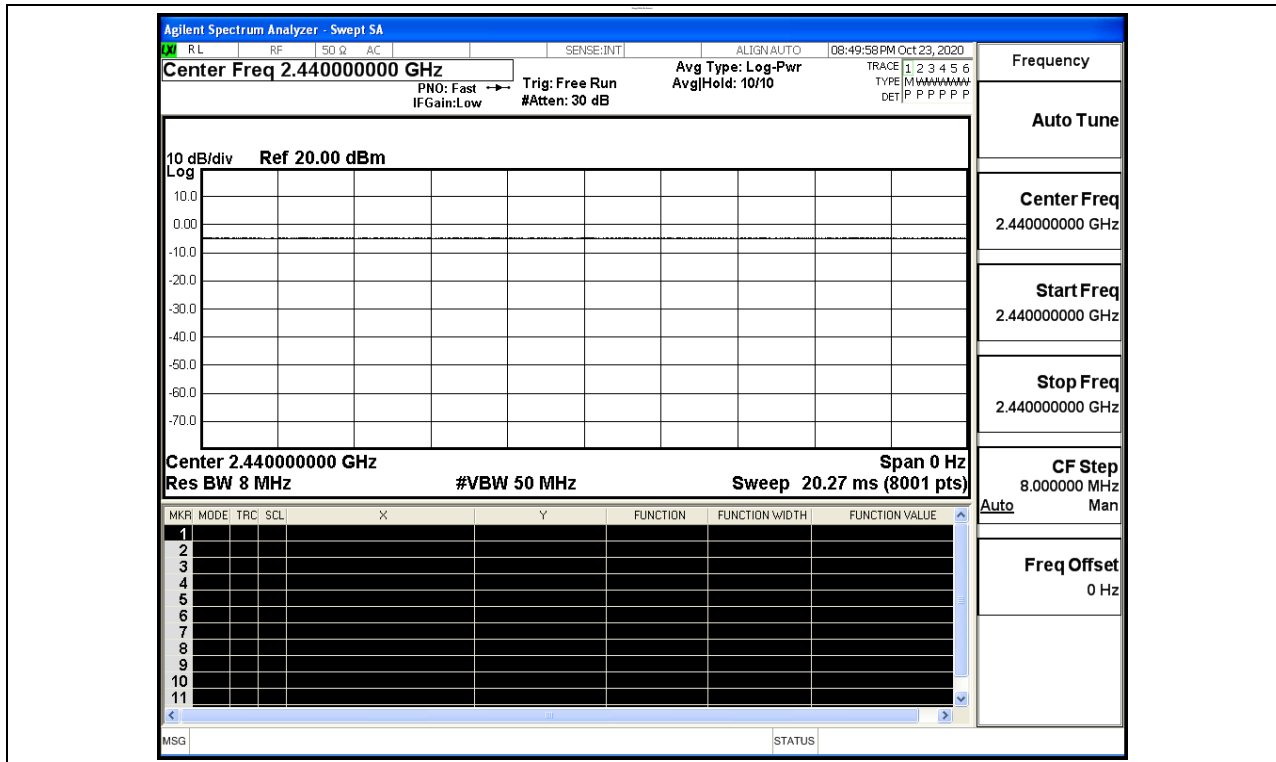
Test Model: 10WWA464B

Environmental Conditions

Temperature:	23.6 ° C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

B.1 Duty Cycle

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BT LE	2440	Ant1	100	PASS



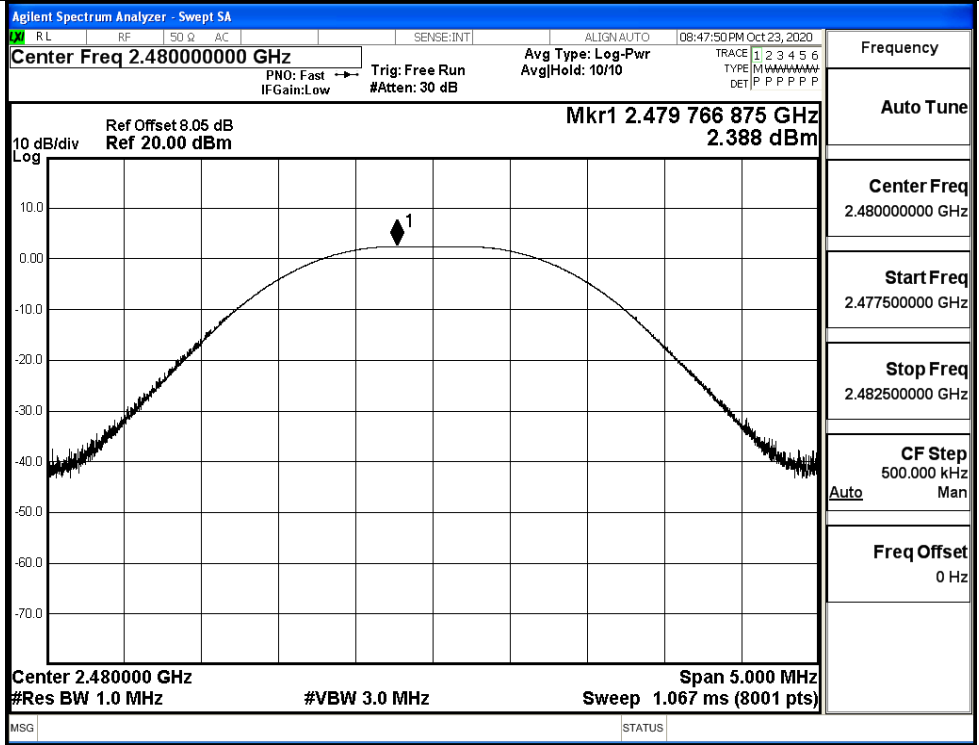
B.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
BT LE	LCH	3.215	30	PASS
BT LE	MCH	3.106	30	PASS
BT LE	HCH	2.388	30	PASS

Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.40200000 GHz Mkr1 2.402 231 875 GHz 3.215 dBm Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log Center 2.402000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 5.000 MHz Sweep 1.067 ms (8001 pts)</p>	<table border="1"> <tr><td>Frequency</td></tr> <tr><td>Auto Tune</td></tr> <tr><td>Center Freq 2.402000000 GHz</td></tr> <tr><td>Start Freq 2.399500000 GHz</td></tr> <tr><td>Stop Freq 2.404500000 GHz</td></tr> <tr><td>CF Step 500.000 kHz Auto Man</td></tr> <tr><td>Freq Offset 0 Hz</td></tr> </table>	Frequency	Auto Tune	Center Freq 2.402000000 GHz	Start Freq 2.399500000 GHz	Stop Freq 2.404500000 GHz	CF Step 500.000 kHz Auto Man	Freq Offset 0 Hz
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MCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.440000000 GHz Mkr1 2.440 259 375 GHz 3.106 dBm Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log Center 2.440000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Span 5.000 MHz Sweep 1.067 ms (8001 pts)</p>	<table border="1"> <tr><td>Frequency</td></tr> <tr><td>Auto Tune</td></tr> <tr><td>Center Freq 2.440000000 GHz</td></tr> <tr><td>Start Freq 2.437500000 GHz</td></tr> <tr><td>Stop Freq 2.442500000 GHz</td></tr> <tr><td>CF Step 500.000 kHz Auto Man</td></tr> <tr><td>Freq Offset 0 Hz</td></tr> </table>	Frequency	Auto Tune	Center Freq 2.440000000 GHz	Start Freq 2.437500000 GHz	Stop Freq 2.442500000 GHz	CF Step 500.000 kHz Auto Man	Freq Offset 0 Hz
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CF Step 500.000 kHz Auto Man									
Freq Offset 0 Hz									

HCH



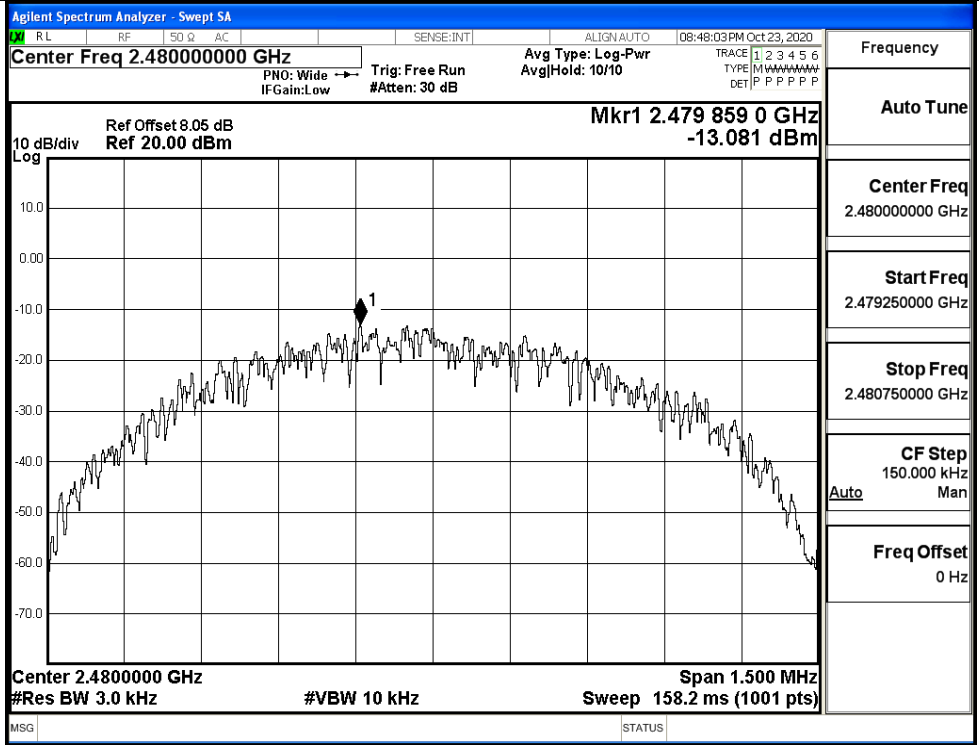
B.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
BT LE	LCH	-12.335	8	PASS
BT LE	MCH	-12.516	8	PASS
BT LE	HCH	-13.081	8	PASS

Test Graphs

LCH		<table border="1"> <tr><td>Frequency</td></tr> <tr><td>Auto Tune</td></tr> <tr><td>Center Freq 2.40200000 GHz</td></tr> <tr><td>Start Freq 2.401250000 GHz</td></tr> <tr><td>Stop Freq 2.402750000 GHz</td></tr> <tr><td>CF Step 150.000 kHz Auto</td></tr> <tr><td>Freq Offset 0 Hz</td></tr> </table>	Frequency	Auto Tune	Center Freq 2.40200000 GHz	Start Freq 2.401250000 GHz	Stop Freq 2.402750000 GHz	CF Step 150.000 kHz Auto	Freq Offset 0 Hz
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Start Freq 2.439250000 GHz									
Stop Freq 2.440750000 GHz									
CF Step 150.000 kHz Auto									
Freq Offset 0 Hz									

HCH

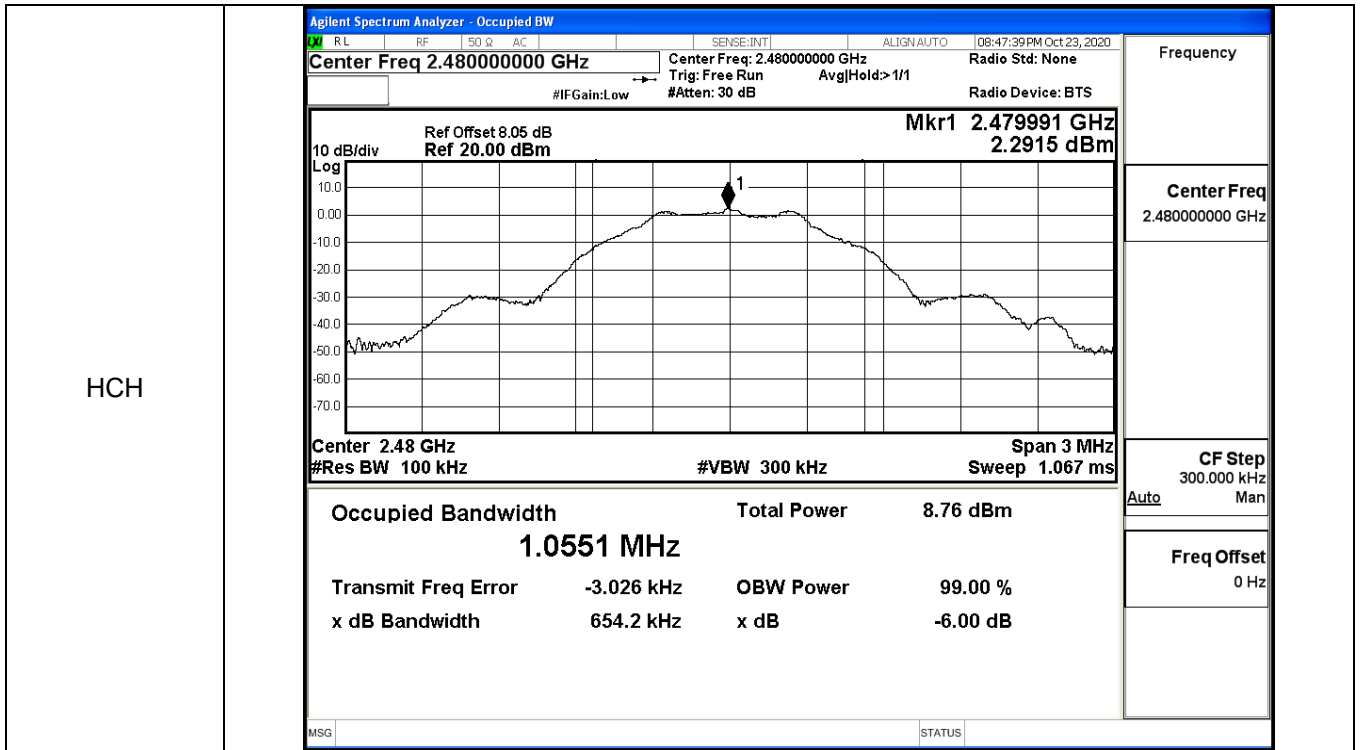


B.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
BT LE	LCH	0.6509	≥0.5	PASS
BT LE	MCH	0.6610	≥0.5	PASS
BT LE	HCH	0.6542	≥0.5	PASS

Test Graphs

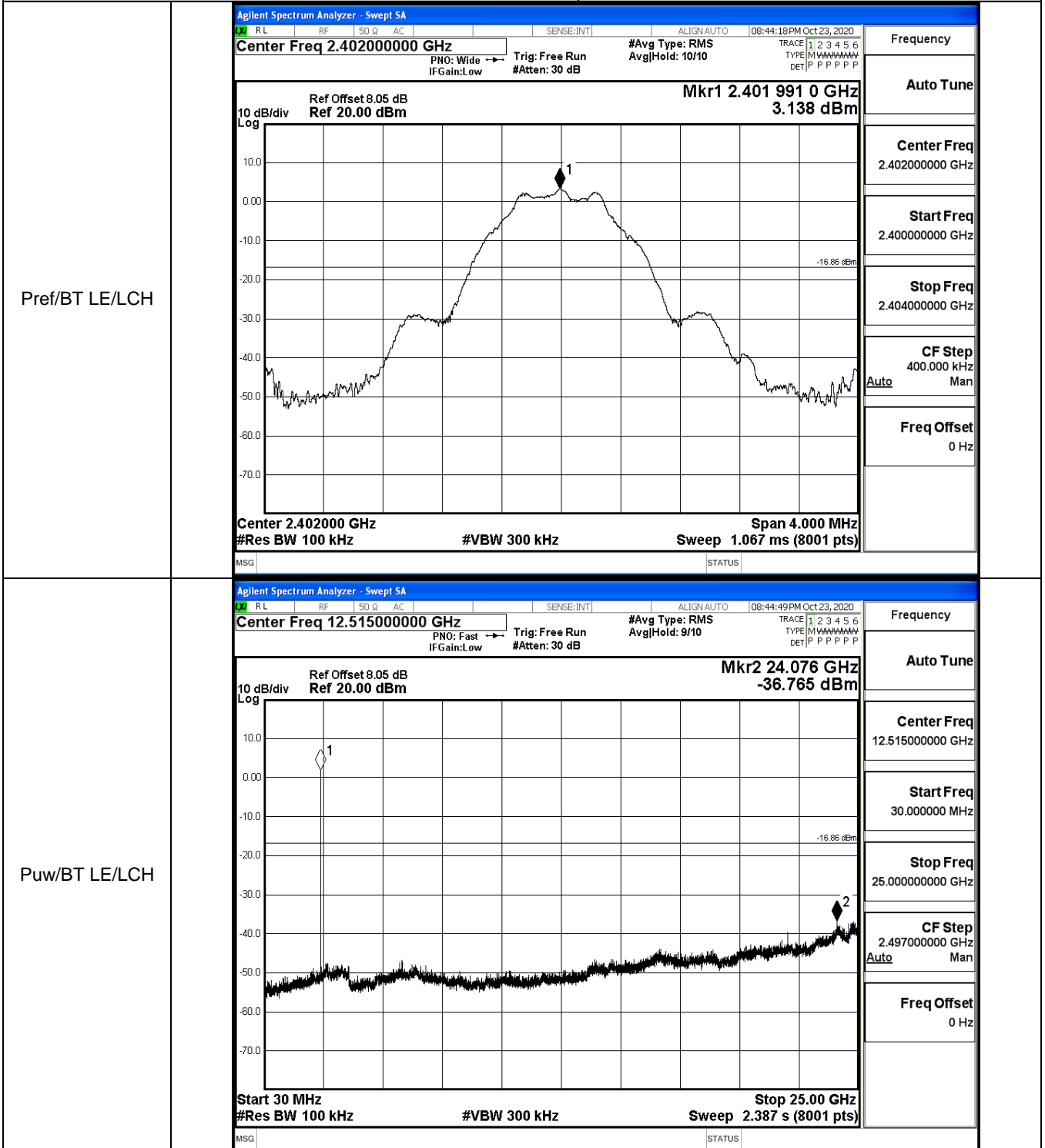
LCH	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz</p> <p>Center Freq: 2.40200000 GHz Trig: Free Run #IFGain:Low #Atten: 30 dB</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>Mkr1 2.4020011 GHz 3.0384 dBm</p> <p>Center 2.402 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1.067 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>9.57 dBm</td> </tr> <tr> <td>1.0491 MHz</td> <td></td> <td></td> </tr> <tr> <td>Transmit Freq Error</td> <td>-8.506 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>650.9 kHz</td> <td>x dB -6.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	9.57 dBm	1.0491 MHz			Transmit Freq Error	-8.506 kHz	OBW Power 99.00 %	x dB Bandwidth	650.9 kHz	x dB -6.00 dB	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 300.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
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B.5 RF Conducted Spurious Emissions

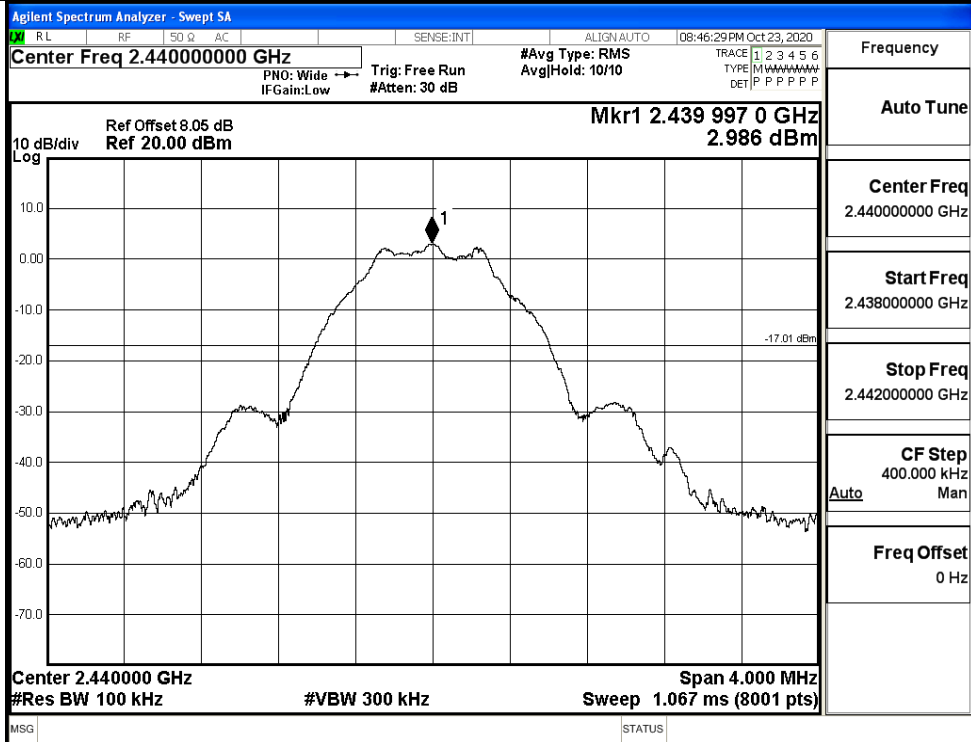
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	3.138	-36.765	-16.862	PASS
BT LE	MCH	2.986	-36.504	-17.014	PASS
BT LE	HCH	2.312	-37.325	-17.688	PASS

BT LE_LCH_Graphs

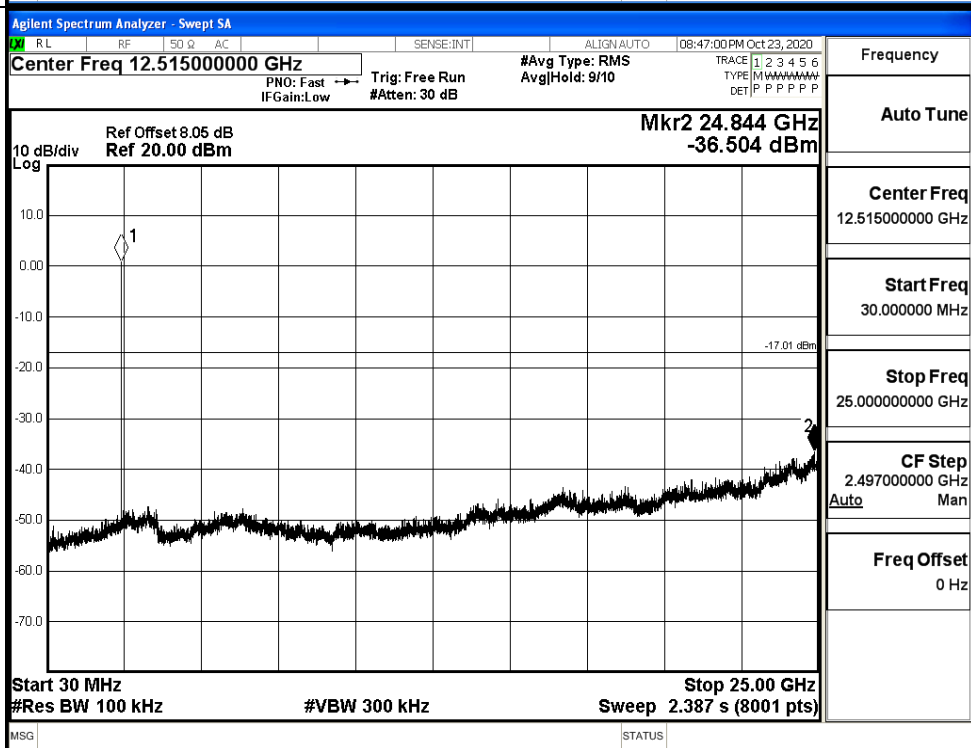


BT LE_MCH_Graphs

Pref/BT LE/MCH

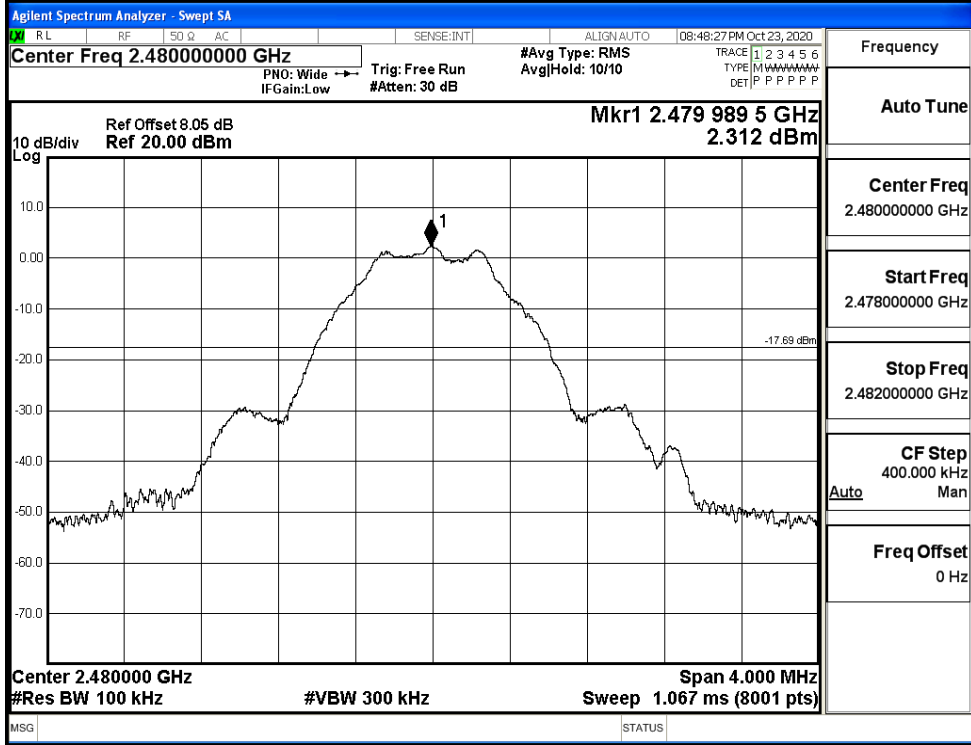


Puw/BT LE/MCH

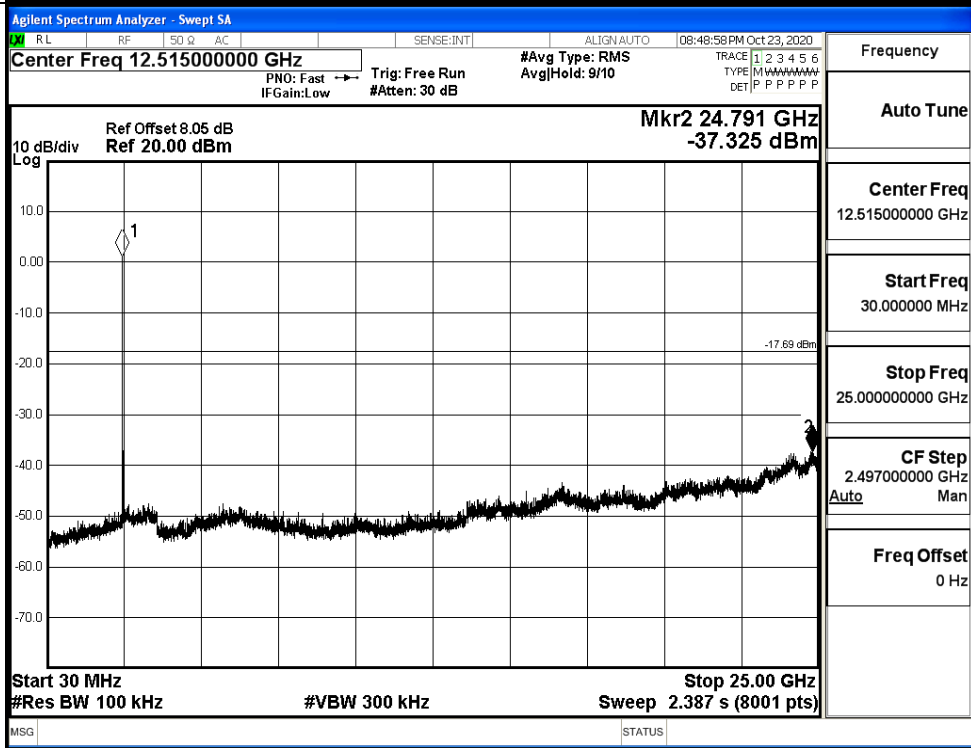


BT LE_HCH_Graphs

Pref/BT LE/HCH



Puw/BT LE/HCH



B.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
BT LE	LCH	3.299	-49.460	-16.7	PASS
BT LE	HCH	2.494	-37.212	-17.51	PASS

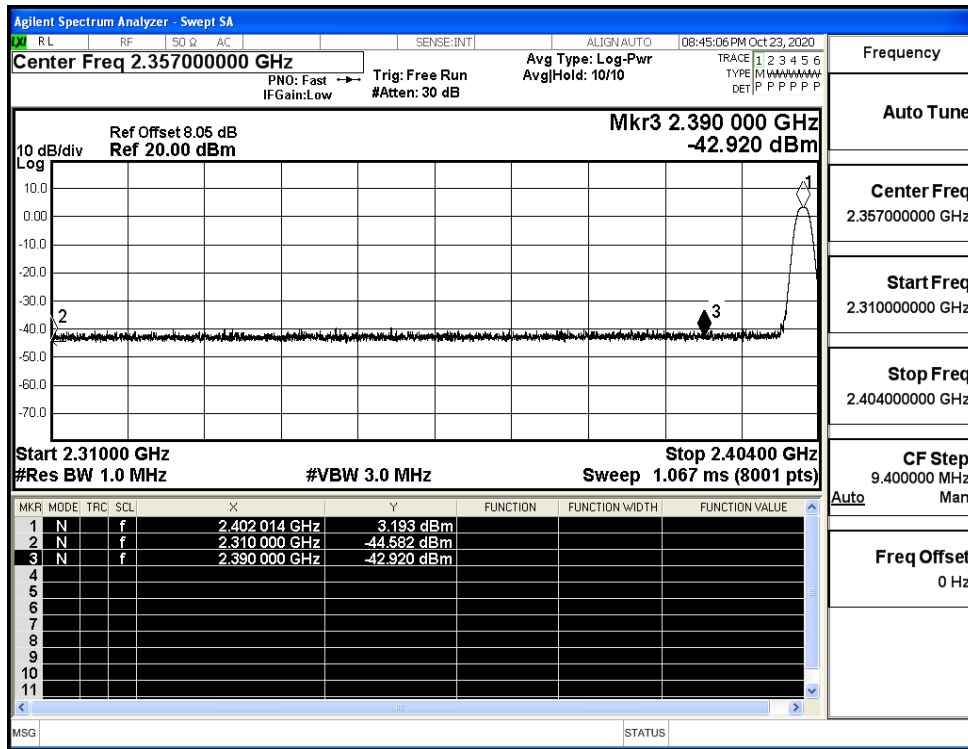
Test Graphs

LCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.35700000 GHz Ref Offset 8.05 dB, Ref 20.00 dBm Mkr4 2.355 144 GHz -49.460 dBm Start 2.31000 GHz, Stop 2.40400 GHz #Res BW 100 kHz, #VBW 300 kHz, Sweep 9.067 ms (8001 pts)</p> <table border="1" style="width: 100%; font-size: small;"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>f</td><td></td><td>2.402 003 GHz</td><td>3.299 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.400 000 GHz</td><td>-44.817 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.390 000 GHz</td><td>-53.670 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.355 144 GHz</td><td>-49.460 dBm</td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.402 003 GHz	3.299 dBm				2	N	f		2.400 000 GHz	-44.817 dBm				3	N	f		2.390 000 GHz	-53.670 dBm				4	N	f		2.355 144 GHz	-49.460 dBm				Frequency Auto Tune Center Freq 2.35700000 GHz Start Freq 2.310000000 GHz Stop Freq 2.404000000 GHz CF Step 9.400000 MHz Freq Offset 0 Hz
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4	N	f		2.355 144 GHz	-49.460 dBm																																										
HCH	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.48900000 GHz Ref Offset 8.05 dB, Ref 20.00 dBm Mkr4 2.484 996 00 GHz -37.212 dBm Start 2.47800 GHz, Stop 2.50000 GHz #Res BW 100 kHz, #VBW 300 kHz, Sweep 2.133 ms (8001 pts)</p> <table border="1" style="width: 100%; font-size: small;"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>f</td><td></td><td>2.479 999 25 GHz</td><td>2.494 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.483 500 00 GHz</td><td>-51.645 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.500 000 00 GHz</td><td>-51.012 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.484 996 00 GHz</td><td>-37.212 dBm</td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.479 999 25 GHz	2.494 dBm				2	N	f		2.483 500 00 GHz	-51.645 dBm				3	N	f		2.500 000 00 GHz	-51.012 dBm				4	N	f		2.484 996 00 GHz	-37.212 dBm				Frequency Auto Tune Center Freq 2.489000000 GHz Start Freq 2.478000000 GHz Stop Freq 2.500000000 GHz CF Step 2.200000 MHz Freq Offset 0 Hz
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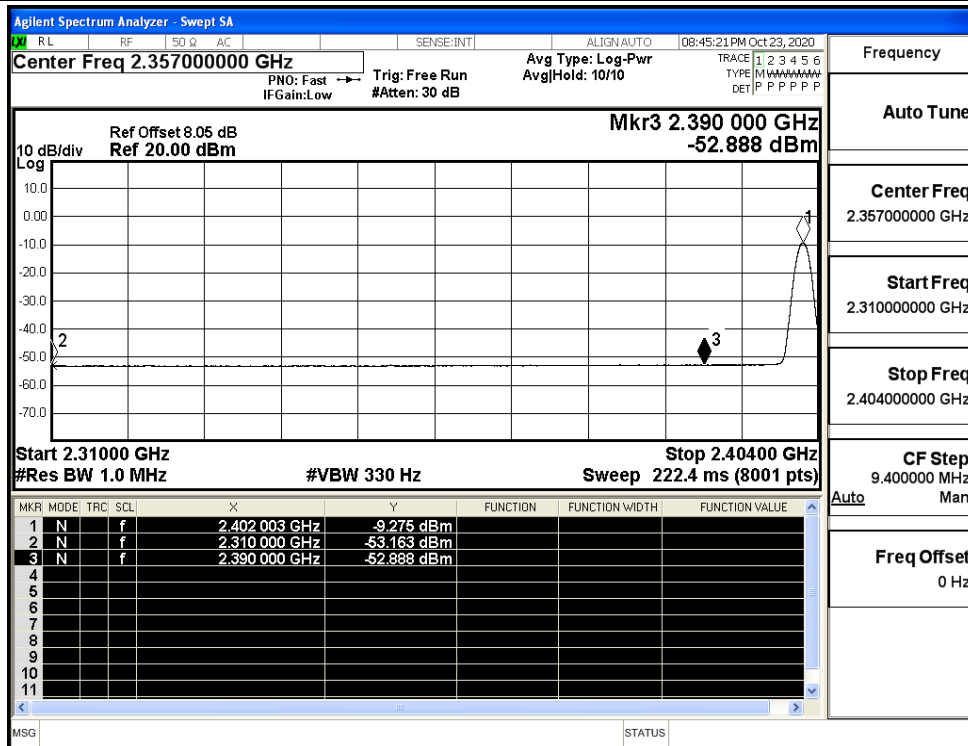
B.7 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
BT LE	2402	Ant1	2310.0	-44.58	2.0	0	50.68	PEAK	74	PASS
		Ant1	2310.0	-53.16	2.0	0	42.09	AV	54	PASS
		Ant1	2390.0	-42.92	2.0	0	52.34	PEAK	74	PASS
		Ant1	2390.0	-52.89	2.0	0	42.37	AV	54	PASS
	2480	Ant1	2483.5	-39.30	2.0	0	55.96	PEAK	74	PASS
		Ant1	2483.5	-52.12	2.0	0	43.14	AV	54	PASS
		Ant1	2500.0	-42.30	2.0	0	52.96	PEAK	74	PASS
		Ant1	2500.0	-52.23	2.0	0	43.02	AV	54	PASS

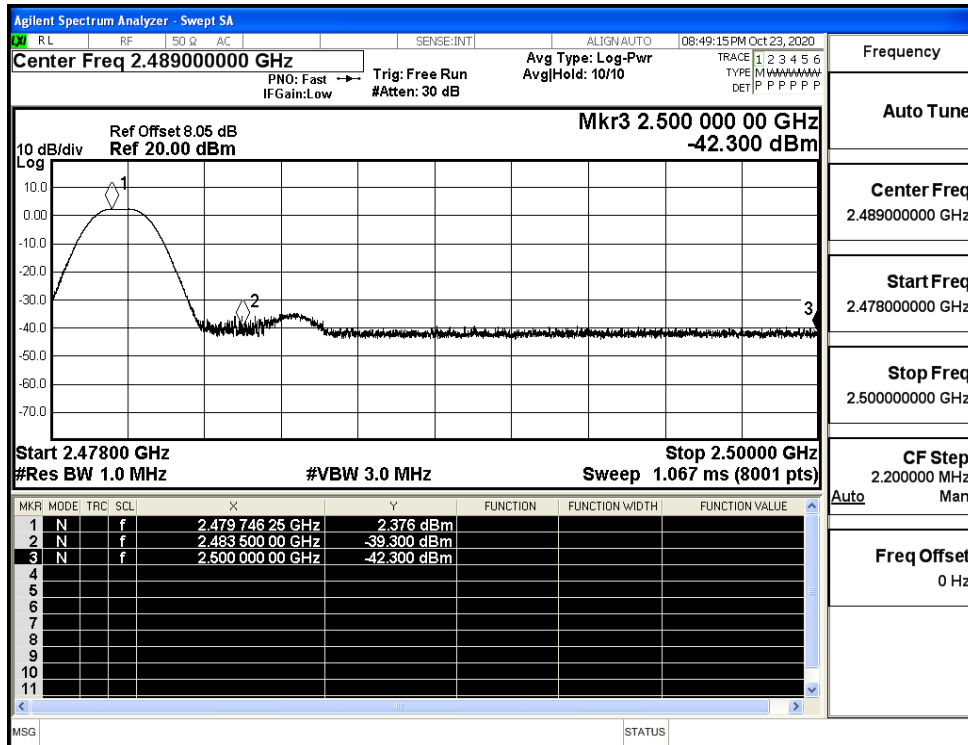
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



Restrict-band band-edge measurements_BT LE_2402_Ant1_AV



Restrict-band band-edge measurements_BT LE_2480_Ant1_PEAK



Restrict-band band-edge measurements_BT LE_2480_Ant1_AV

